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(56) Documents cited

GB 1142910 A WO 90/01853 A US 5027200 A

(58) Field of search

UK CL (Edition K) B7J J69, G2J JRF

INT CL⁵ B60R

(54) **Retractable viewing apparatus**

(57) A vehicle is equipped with a receiving unit (10) for receiving a rear-view image which is transmitted to a monitor (13) by means of a cable (16). The receiving unit is movably mounted within a housing (12) and can be retracted to lie within the body of the vehicle when not in use. The housing incorporates a cleaning roller or pad which wipes the viewing window (11) of the receiving unit each time the unit is extended to its use position.

The receiving unit (10) may be a video camera connected by cable to the monitor (13) or an optical device connected by optical fibres to the monitor (13).

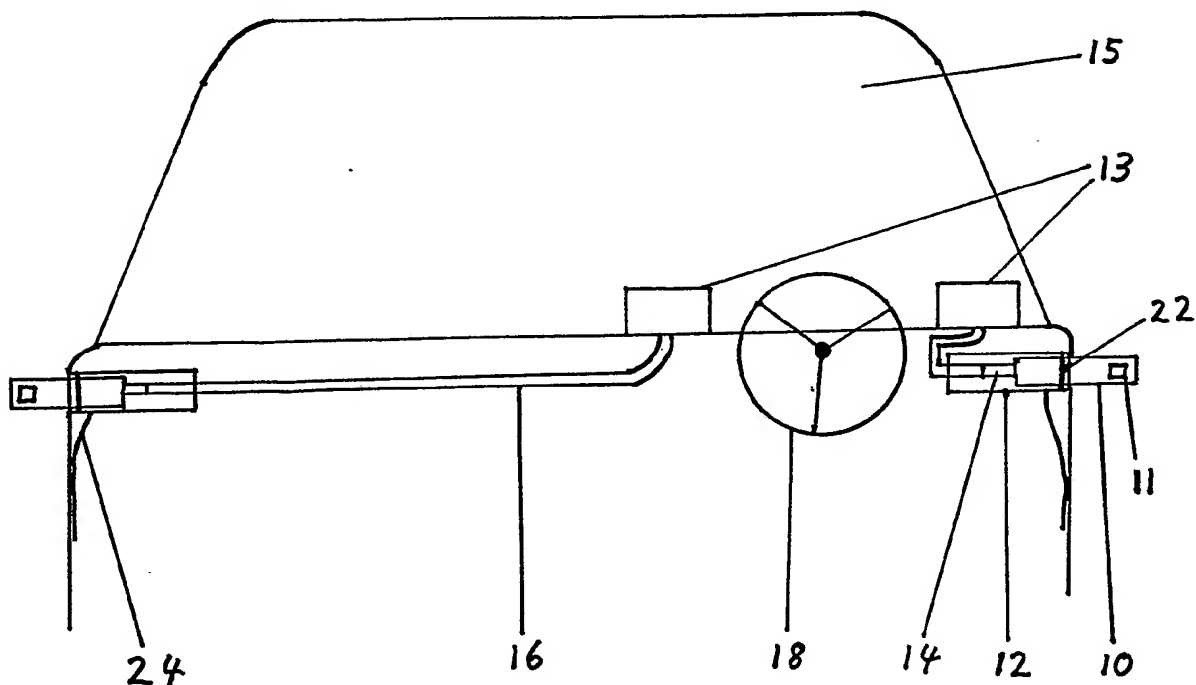


FIG. 1

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

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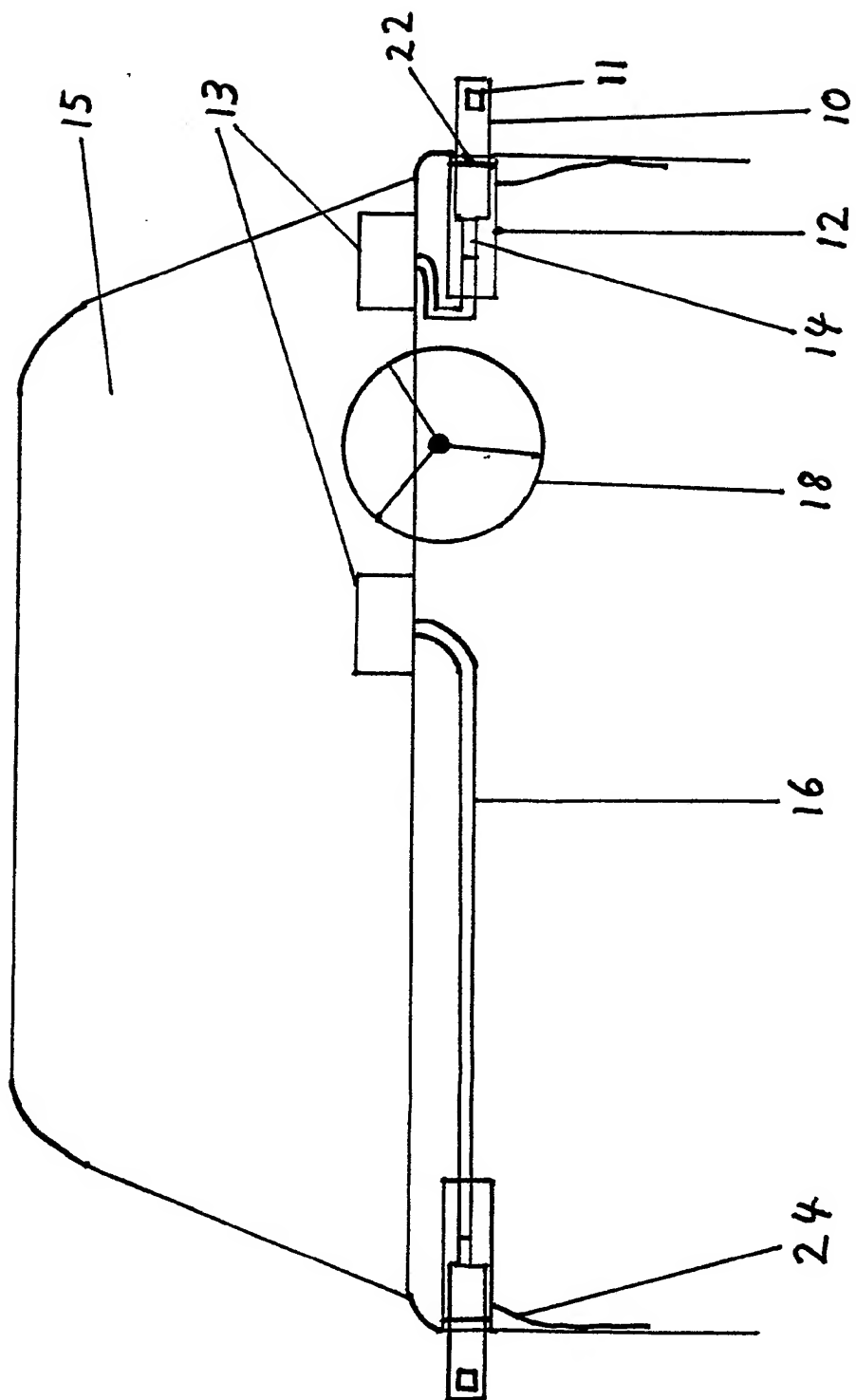


FIG. 1

FIG. 2

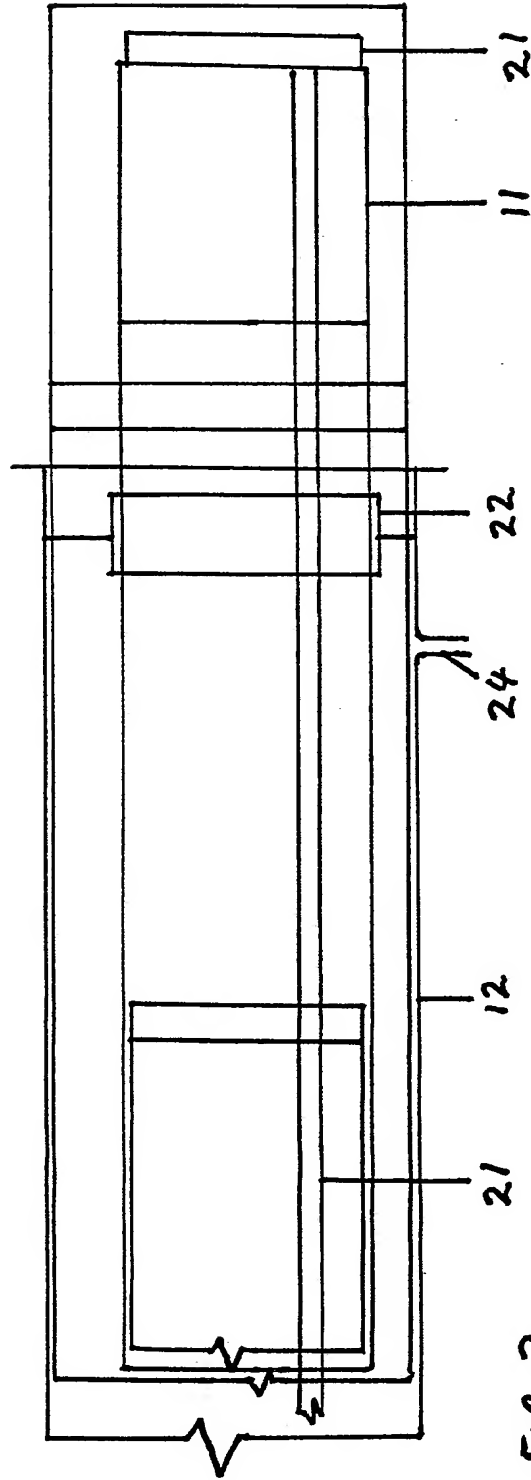
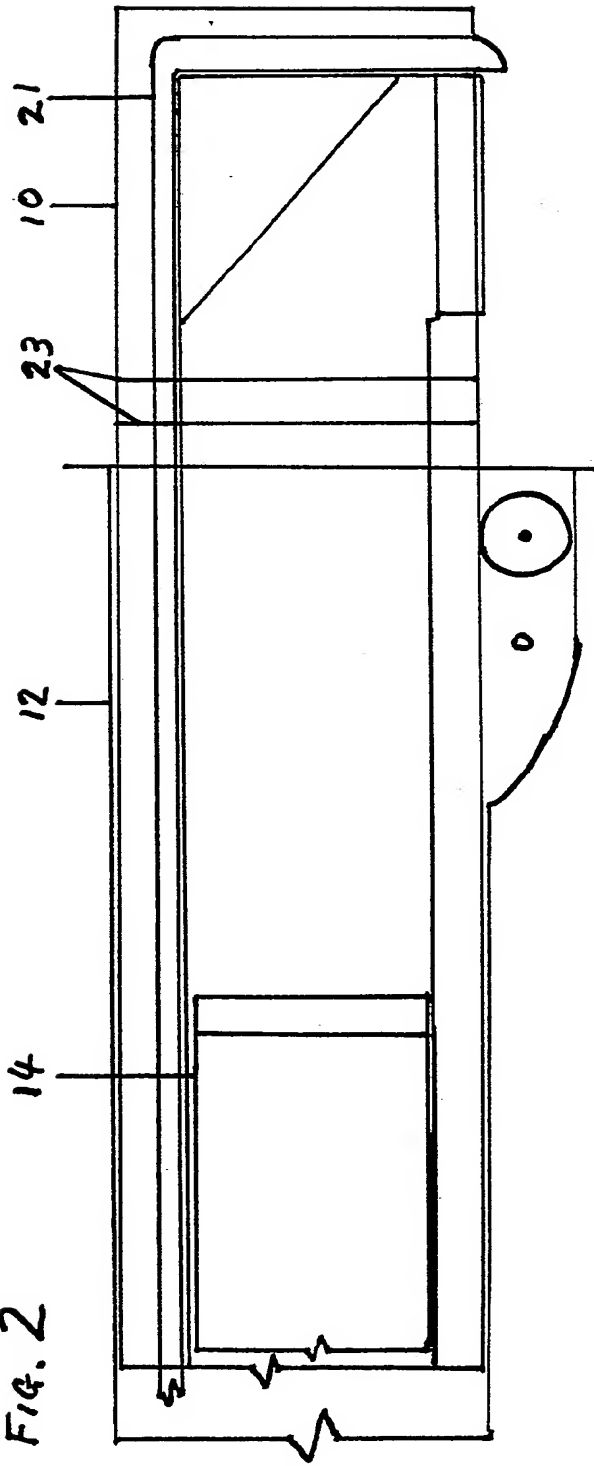


FIG. 3

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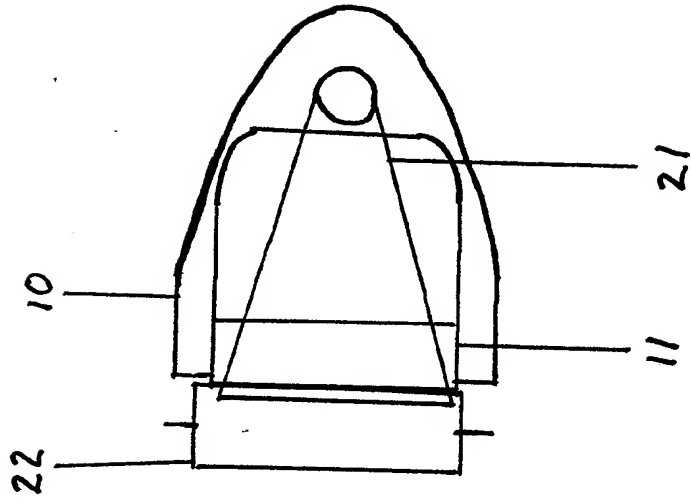


FIG. 5

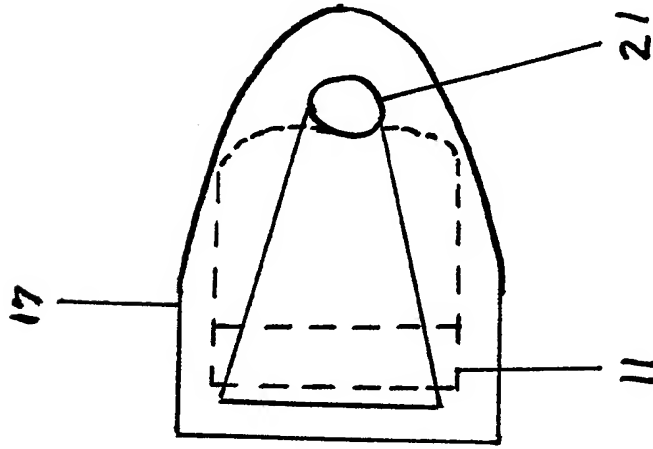


FIG. 4

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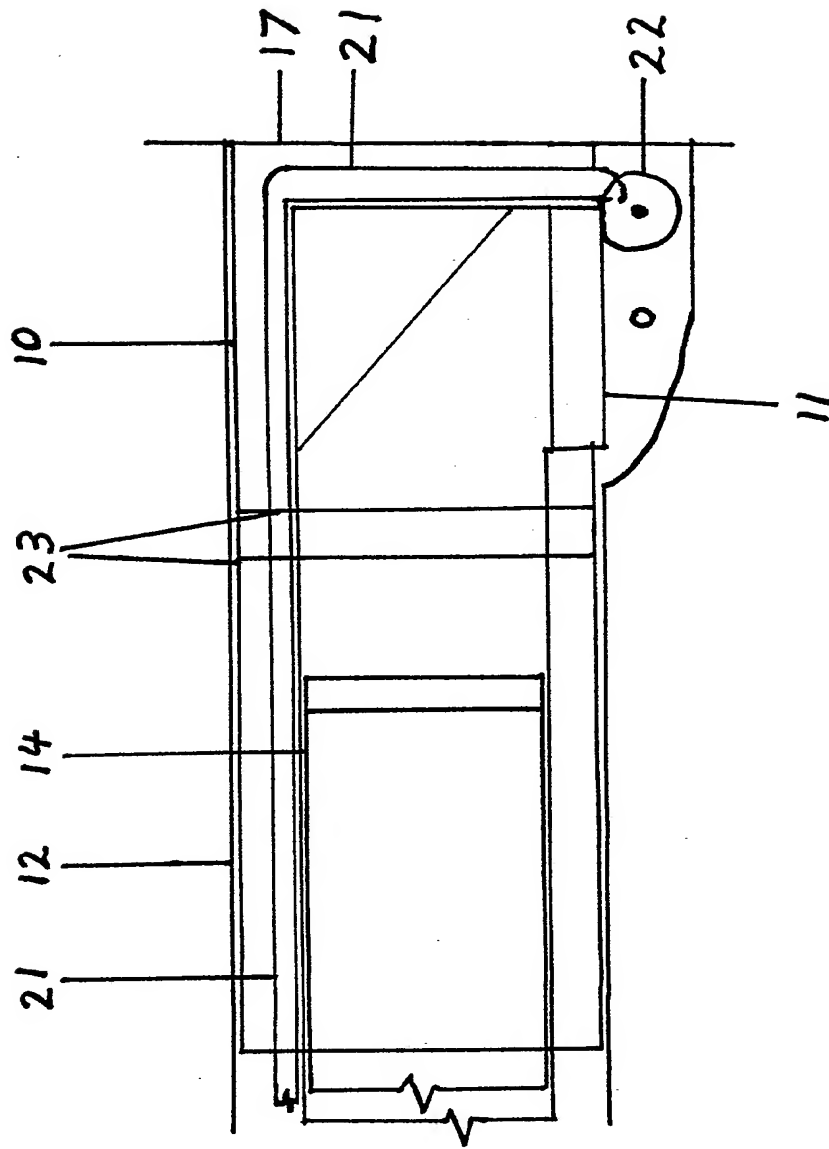


FIG. 6

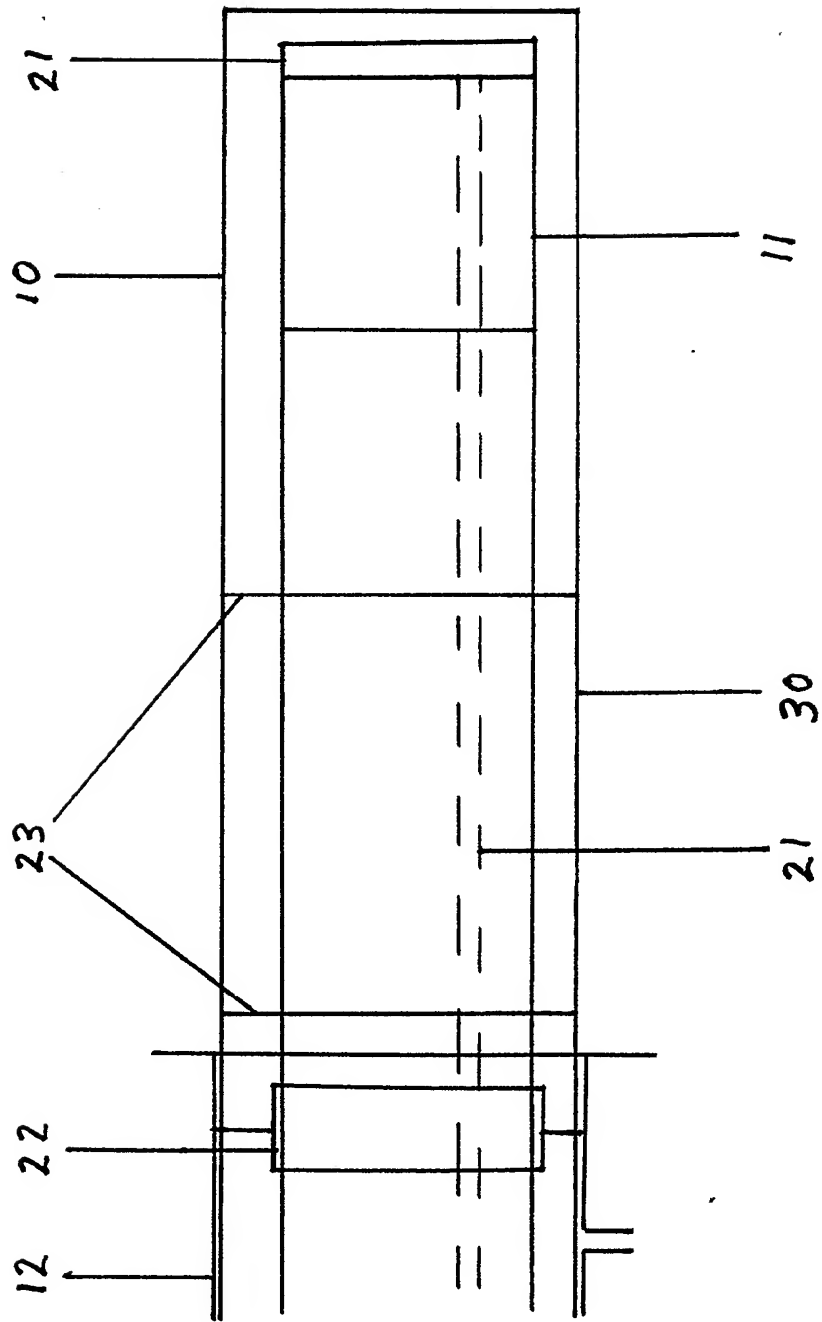


FIG. 7

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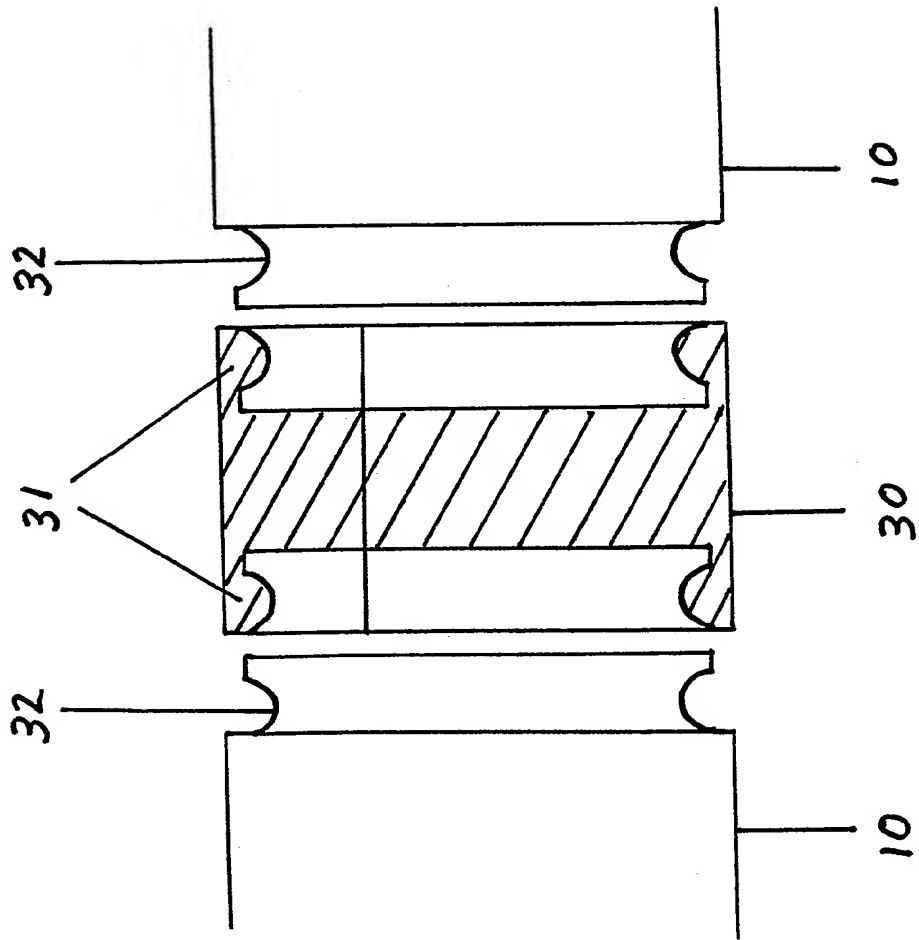


FIG. 8

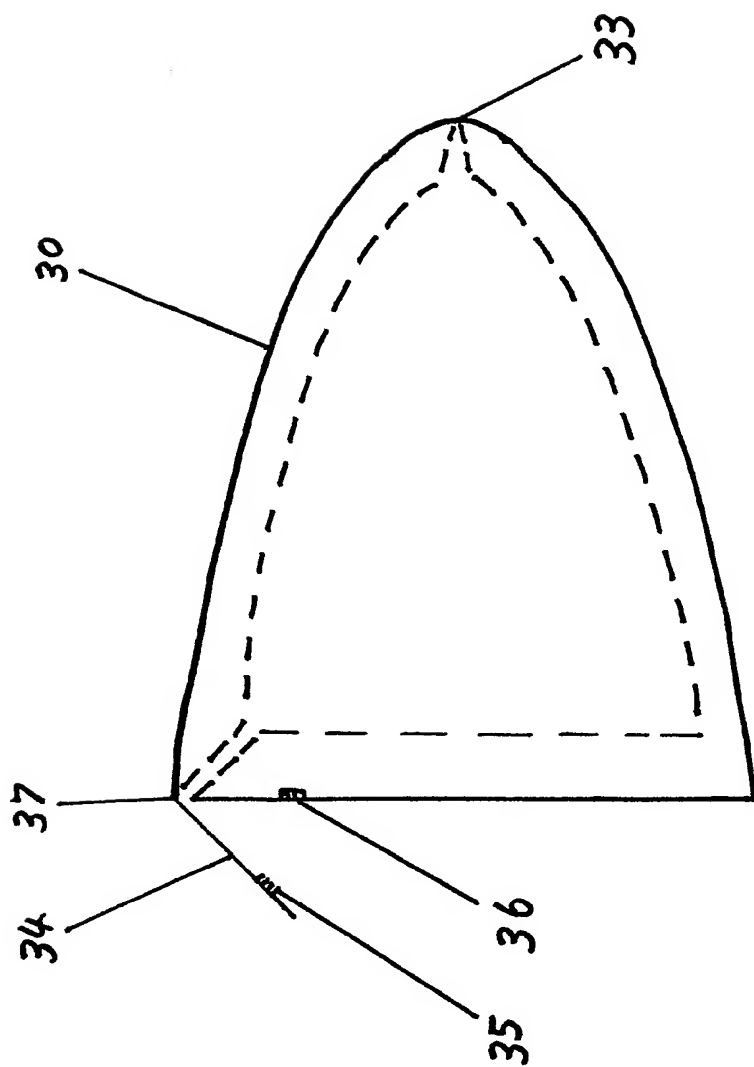


FIG. 9

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VIEWING APPARATUS

This invention relates to a viewing apparatus particularly but not exclusively for use with vehicles.

It is known to provide on fixed structures such as buildings, or movable units such as motor vehicles, remote viewing apparatus comprising a receiver and a remote display unit. This apparatus may for example comprise a video camera connected by a cable to a remote monitor, or an optical system connected by, for example, optical fibre cable to a monitor. In all cases, the receiver unit is usually in an exposed position and as such is vulnerable to damage, theft and vandalism.

According to a feature of my invention, a housing is provided adjacent the receiver unit, and means are provided to retract the unit into the housing for safety when not in use. In this way, the valuable unit can be protected from theft and damage.

Whilst my invention is applicable in a wide variety of situations where such viewing apparatus is used, it is of particular interest for use with vehicles. All road vehicles and most other vehicles have a rear-view mirror system to enable the driver to see what is happening to the rear, and usually also to the sides of the vehicle. In recent times, it has been suggested to provide one or more monitor screens within the vehicle, the screens displaying images picked up by receiver units, e.g. video

cameras or optical units, mounted on the vehicle. Thus, the conventional rear-view mirror systems can be replaced by video or other optical arrangements to display the relevant image(s) in front of the driver.

In accordance with my invention, the receiver units are mounted externally of the vehicle and are retractable into an adjacent recess or compartment when not in use. Thus, in the case of wing mirror units, the receiver will be housed in an adjacent recess in the vehicle body, and will be movable to project outwardly when in use (e.g. when the vehicle engine is running) and to be retracted when not in use.

According to a preferred feature of my invention, cleaning means are provided whereby when the receiver unit is moved into and/or out of its housing the surface of the receiver unit through which the image is received is cleaned. For example, a cleaning pad or the like can be provided to sweep the lens surface as it moves past. Alternatively, or in addition, means can be provided to clean the receiver when it is in the operative position. For example, air ducts can be provided to blow air over the lens surface periodically or continuously, to keep it clear of soils and debris.

In the case of receivers being used on the sides of vehicles, for example in place of conventional wing mirrors, the receivers will normally be retracted to lie within the car body when not in use, but will extend laterally outwardly of the car body when in use. In accordance with a further preferred feature of my invention, the extent of projection can be varied as the user wishes, in order for example to make the unit useful when towing caravans or the like. This variation can be achieved, for example, by including an extension member in the receiver unit. It is not necessary to be able to extend on vehicles not designed to tow.

In order that the invention may be more fully understood, one embodiment thereof will now be described by way of example only, with reference to the accompanying drawings in which:

Figure 1 is a forward view from inside the front of a car;

Figure 2 shows a top section of the right hand lens housing and receiving unit of Figure 1 in extended position;

Figure 3 is a sectional view from the rear of the lens housing and receiving unit extended;

Figure 4 is a schematic transverse section of the projecting unit, showing the shape of cover;

Figure 5 is a transverse section;

Figure 6 shows a receiving unit retracted into the lens housing as viewed from above;

Figure 7 shows the lens extension attached between the lens housing and that part of the receiving unit containing the receiver window;

Figure 8 is a cross-sectional view of a clamp/extension; and

Figure 9 shows an end elevation of the clamp/extension of Figure 8.

Referring to the drawings there is illustrated in Figure 1 a motor vehicle provided at the near side and the off side with devices for receiving an image from the rearward direction of the vehicle. Each respective image is conveyed to a monitor 13 mounted where it can be seen by the driver of the vehicle.

Each image receiving device comprises a movable image receiving unit 10 mounted for horizontal sliding movement within a housing 12. Each unit 10 will, when the vehicle is in use, be positioned to extend outwardly from the body of the vehicle in a use configuration as illustrated in Figures 1-3. When the vehicle is not in use

the receiving unit is retracted within the housing to the position illustrated in Figure 6. Extension and retraction of the receiving unit may be controlled automatically (e.g. by the ignition switch of the vehicle) or may be controlled selectively by driver operated controls.

Each receiving unit is connected to its associated monitor 13 by an appropriate cable 16. The system may comprise a receiving lens in each receiving unit for focusing the received image on an array of optical fibres contained within the cable 16. The image conveyed by the optical fibres will then be reproduced on the monitors 13. In the alternative, each receiving unit may incorporate a CCTV camera which is connected to an appropriate video monitor 13 by a suitable cable. In either event, the system functions to provide images on the monitors 13 corresponding to the images received by the receiving units 10.

Each receiving unit 10 comprises a window 11 through which the received image passes, together with suitable means for diverting the received image to the receiving lens. Such means may comprise a mirror or a prism or any other suitable optical arrangement.

A roller or pad 22 is located within the housing for cleaning the window 11. The roller or pad 22 may be fixed, but in the preferred embodiment of the invention is a motor driven rotatable roller. Suitable means for supplying liquid cleaning agent to the roller are preferably provided. Accordingly each time the receiving unit is extended to its use configuration the window 11 is cleaned by the pad or roller 22.

Preferably, a tube 21 is provided for piping air under pressure to the window to keep the window clear of road dirt, splashes, and rain in use.

In the preferred embodiment of the invention the outer portion of the receiving unit 10 is connected to the

inner portion thereof by means of a releasable joint 23. This enables the outer portion to be replaced readily in the event of damage and, in the event that the vehicle is to be used for towing a caravan or the like enables an extension 30 to be inserted between the outer and inner portions of the receiving unit in order to space the window 11 laterally further from the driver than its normal use position.

One possible form of extension 30 is illustrated in Figure 8. The illustrated extension comprises a hollow tube having tongues 31 at opposite ends thereof which snap fit into engagement with grooves 32 provided on the inner and outer portions respectively of the receiving unit.

A transverse view of the extension of Figure 8 is illustrated in Figure 9. The extension incorporates a flap 34 which is connected by a hinge 37 to the remainder of the extension and which can be closed so that the locking parts 35 and 36 are held together securely.

Whilst for most ordinary driving purposes the invention will be used to provide a view to the rear of the vehicle it is possible to use the invention to provide a view to the front of the vehicle. This may be particularly useful if the front view is provided from the opposite side of the vehicle to that on which the steering wheel is located - i.e. from the right side of a left-hand drive vehicle or the left side of a right-hand drive vehicle. Such a view would particularly facilitate overtaking when the vehicle is being driven in a country which drives on the opposite side of the road from that for which the vehicle was designed. The forward view may be obtained by reversing the outermost part of the receiver unit or by substituting a special outermost part which provides a forward image or a forward/rear split image for the standard receiver unit.

CLAIMS

1. A viewing apparatus for a vehicle, the apparatus comprising a receiving unit for receiving an image from the rearward direction of the vehicle; means for displaying the received image within the field of vision of the driver of the vehicle; and a housing from which the receiving unit, in its normal use position, projects, the receiving unit being retractable into the housing for safety when not in use.

2. A device according to claim 1 wherein the receiving unit incorporates a window through which the received image passes, and wherein means are provided for cleaning the window.

3. A device according to claim 2 wherein the cleaning means is mounted in the housing and is operable automatically to clean the window each time the receiving unit is extended to its use position.

4. A device according to any preceding claim wherein the receiving unit can selectively be withdrawn into the housing whilst the vehicle is in use in order to clean the window.

5. A device according to any preceding claim including means for keeping the window clear of dirt, splashes and rain whilst in use.

6. A device according to claim 5 wherein the means for keeping the window clear comprises a tube for supplying air under pressure to the window.

7. A device according to any preceding claim adapted to provide a view from the forward direction of the vehicle in addition to or instead of the view from the rear direction of the vehicle.

8. A device substantially as hereinbefore described with reference to and as shown in the accompanying drawing.

Patents Act 1977

**Examiner's report to the Comptroller under
Section 17 (The Search Report)**

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Application number

9208491.2

Relevant Technical fields

(i) UK CI (Edition K) B7J (J69) : G2J (JRF)

(ii) Int CL (Edition 5) B60R

Search Examiner

PHIL THORPE

Databases (see over)

(i) UK Patent Office

(ii)

Date of Search

30 JUNE 1992

Documents considered relevant following a search in respect of claims

1-8

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	GB 1142910 (PAYET) - see whole document	1, 2, 5
X	WO 90/01853 (PETROSSIAN) - see particularly page 8 line 11 - page 9 line 12 and Figures 2, 3	1
P,X	US 5027200 (PETROSSIAN) - see Figures 2, 3 and Column 3 line 46-Column 4 line 13	1

Category	Identity of document and relevant passages	Relevant to claim(s)

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

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